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S/N 10/585629

PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	MAESAWA ET AL.	Examiner:	MABRY, JOHN
Serial No.:	10/585629	Group Art Unit:	1625
Filed:	July 11, 2006	Docket No.:	14633.0009USWO
Title:	METHOD OF DEUTERATION USING MIXED CATALYST		

CERTIFICATE UNDER 37 CFR 1.6(d):

I hereby certify that this paper is being transmitted by facsimile to the U.S. Patent and Trademark Office on December 2, 2009

By: Justine L Suleski  
Name: Justine L Suleski

SUPPLEMENTAL COMMUNICATION

Mail Stop: AMENDMENT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Dear Commissioner:

Further to the Amendment filed November 25, 2009, Applicants provide herewith a courtesy copy of the Supplemental Amendment of the applications 10/521531 and 10/539188, which are referred to on page 8 of the Amendment, and the PTO confirmations thereof.

Respectfully submitted,

HAMRE, SCHUMANN, MUELLER &  
LARSON, P.C.  
P.O. Box 2902  
Minneapolis, MN 55402-0902  
(612) 455-3800

By: Douglas P. Mueller

Douglas P. Mueller  
Reg. No. 30,300

Dated: December 2, 2009

DPM/my/jls

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S/N 10/521531

PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: ITO ET AL Examiner: NWAONICHA, Chukwuma O.  
Serial No.: ~~10/521531~~ <sup>BU</sup> Group Art Unit: 1621  
Filed: January 14, 2005 Docket No.: 14633.0006USWO  
Title: A METHOD FOR DEUTERATION OF AN AROMATIC RING

CERTIFICATE UNDER 37 CFR 1.6(d):

I hereby certify that this paper is being transmitted by facsimile to the U.S. Patent and Trademark Office on November 25, 2009.

By: Justine L. Suleski

Name: Justine L. Suleski

SUPPLEMENTAL AMENDMENT

Mail Stop: AMENDMENT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Dear Sir:

Further to the Amendment and Response filed June 30, 2009, Applicants submit the following in response to the Office Action dated March 30, 2009:

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 5 of this paper.

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Documentation  
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10/585629  
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Application Number 10/521531  
Supplemental Amendment to Amendment and Response filed on July 30, 2009  
responding to the Office Action dated March 30, 2009

**Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in the application.

**Listing of Claims:**

1. (Currently Amended) A method for deuteration of an aromatic ring comprising:  
reacting the aromatic ring under a neutral condition with a deuterated solvent other than deuterium peroxide ( $D_2O_2$ ) in the presence of only at least one activated catalyst selected from a platinum catalyst, a rhodium catalyst, a ruthenium catalyst, a nickel catalyst and a cobalt catalyst,

wherein the aromatic ring may have at least one substituent and is at least one selected from the group consisting of benzene, naphthalene, anthracene, phenanthrene, 9,10-dihydroanthracene, naphthacene, pentaphene, pentacene, hexaphene, hexacene, heptaphene, heptacene, trinaphthylene, 1,4-dihydronaphthalene, pyrene, triphenylene, biphenylene, indene, indan, indacene, phenalene, fluorene, acenaphthene, acenaphthylene, fluoranthene, tetraphenylene, coranthrene, acephenanthrylene, aceanthrylene, cyclopentaphenanthrene, chrysene, picene, pleiadene, rubicene, pyranthrene, coronene, perylene, rubrene, dibenzophenanthrene, 1,2-dibenzo-1,3-cycloheptadiene and ovalene, and

the only at least one activated catalyst is activated with hydrogen gas or heavy hydrogen gas.

2. (Original) The method for deuteration according to claim 1, wherein the catalyst is an activated platinum catalyst.

3. (Original) The method for deuteration according to claim 2, wherein the platinum catalyst is one comprising platinum of 0 to 2 valences.

Application Number 10/521531

Supplemental Amendment to Amendment and Response filed on July 30, 2009  
responding to the Office Action dated March 30, 2009

4. (Original) The method for deuteration according to claim 2, wherein the platinum catalyst is platinum carbon.

5-6. (Cancelled)

7. (Previously Presented) The method for deuteration according to claim 1, wherein the at least one substituent of the aromatic ring is selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, an oxo group, a thioxo group, a carboxyl group, a sulfo group, a sulfino group, a sulfeno group, a phosphino group, a phosphinoyl group, a formyl group, an amino group, a cyano group and a nitro group.

8. (Previously Presented) The method for deuteration according to claim 1, wherein the at least one substituent of the aromatic ring is selected from the group consisting of an alkyl group, an alkenyl group, an aryl group, an aralkyl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an alkylsulfonyl group, an arylsulfonyl group, an alkylsulfinyl group, an arylsulfinyl group, an alkylphosphino group, an arylphosphino group, an alkylphosphinoyl group, an arylphosphinoyl group, an alkylamino group, an arylamino group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxysulfonyl group, an aryloxysulfonyl group, an acyl group and an acyloxy group, which may further have at least one substituent.

9. (Previously Presented) The method for deuteration according to claim 8, wherein the at least one substituent of the aromatic ring has at least one substituent selected from the group consisting of an alkyl group, an alkenyl group, an alkynyl group, an aryl group, a hydroxy group, an alkoxy group, an amino group, an alkylamino group, a mercapto group, an alkylthio group, an arylthio group, a formyl group, an acyl group, a carboxyl group, an alkoxycarbonyl group, a carbamoyl group and an alkylcarbamoyl group.

10. (Previously Presented) The method for deuteration according to claim 1, wherein the reaction is carried out at 180 °C or lower.

Application Number 10/521531

Supplemental Amendment to Amendment and Response filed on July 30, 2009  
responding to the Office Action dated March 30, 2009

11. (Previously Presented) The method for deuteration according to claim 1, wherein the deuterated solvent is at least one selected from the group consisting of deuterium oxide, deuterated alcohols, deuterated carboxylic acids, deuterated ketones, deuterated dimethylsulfoxide, and tritium oxide.

Application Number 10/521531  
Supplemental Amendment to Amendment and Response filed on July 30, 2009  
responding to the Office Action dated March 30, 2009

**REMARKS**

Favorable reconsideration of this application is requested in view of the following remarks.

Claim 1 has been amended to limit a number of the activated catalyst used in the reaction step to one catalyst. Examples are presented in the specification in table 1 on page 29 of the specification.

In view of the above, Applicants request reconsideration of the application in the form of a Notice of Allowance.



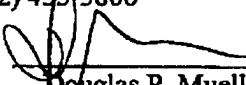
Dated: November 25, 2009

DPM/my/jls

Respectfully submitted,

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By:

  
Douglas P. Mueller  
Reg. No. 30,300

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11/25/2009 3:28:18 PM PAGE 1/001 Fax Server

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**HAMRE, SCHUMANN,  
MUELLER & LARSON, P.C.**  
AN INTERNATIONAL INTELLECTUAL PROPERTY LAW FIRM

**FAX TRANSMISSION**      November 25, 2009

<b>TO:</b> Mail Stop: AMENDMENT Reexaminer: NWACHOGBA, Chibweoma O Commissioner for Patents PO Box 1430 Alexandria, VA 22313-1430	<b>FROM:</b> Douglas P. Mueller  <b>OUR REF:</b> 14633.0066USPPO <b>TELEPHONE:</b> (612) 455.3800
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Total pages, including cover letter: 6


**PTO FAX NUMBER:** 571.279.8330

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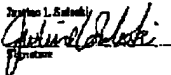
**Title of Document:** SUPPLEMENTAL AMENDMENT (2 PAGES)

**Applicant:** ITO RT AL  
**Serial No.:** 10521531  
**App. Filed:** January 14, 2005  
**Group Art No.:** 1621

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By:   
 Name: Douglas P. Mueller  
 Reg. No.: 30,390

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By:   
 Name: Douglas P. Mueller  
 Date: November 25, 2009

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S/N 10/539188

PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	ITO ET AL	Examiner:	NWAONICHA, CHUKWUMA O
Serial No.:	<del>10/539188</del>	Group Art Unit:	1621
Filed:	June 16, 2005	Docket No.:	14633.0008USWO
Title:	A METHOD OF DEUTERATION		

CERTIFICATE UNDER 37 CFR 1.6(d):

I hereby certify that this paper is being transmitted by facsimile to the U.S. Patent and Trademark Office on November  
25, 2009.

By: Justine L. Suleski  
Name: Justine L. Suleski

SUPPLEMENTAL AMENDMENT

Mail Stop: AMENDMENT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Dear Sir:

Further to the Amendment and Response filed August 12, 2009, Applicants  
submit the following in response to the Office Action dated May 12, 2009:

**Amendments to the Claims** begin on page 2 of this paper.

**Remarks** begin on page 6 of this paper.



Application Number 10/339188

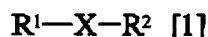
Supplemental Amendment to Amendment and Response filed on August 12, 2009  
responding to the Office Action dated May 12, 2009

**Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in the application.

**Listing of Claims:**

1. (Currently Amended) A method for deuteration of a compound represented by the general formula [1]:



wherein,  $R^1$  represents an alkyl group, an alkyl group having at least one carbon-carbon double bond and/or at least one triple bond, an aralkyl group, or an aralkyl group having at least one carbon-carbon double bond and/or at least one triple bond;  $R^2$  represents an alkyl group or an alkyl group having at least one carbon-carbon double bond and/or at least one triple bond, an aryl group, an aralkyl group, an alkoxy group, an aryloxy group or a hydroxyl group; X represents a carbonyl group or a hydroxymethylene group;  $R^1$  and  $R^2$  may form an alicyclic ring together with a carbon atom contained in X; provided that  $R^2$  represents an alkyl group, an alkyl group having at least one carbon-carbon double bond and/or at least one triple bond, an aryl group or an aralkyl group when X is a hydroxymethylene group, comprising reacting the compound represented by the general formula [1] under neutral condition with a deuterated solvent other than  $D_2O_2$  in the co-presence of ~~an~~ only one activated catalyst selected from a palladium catalyst, a platinum catalyst, a rhodium catalyst, a ruthenium catalyst, a nickel catalyst and a cobalt catalyst; provided that when the compound represented by the general formula [1] has at least one carbon-carbon double bond and/or at least one triple bond, the catalyst activated in advance is used as the activated catalyst.

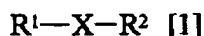
Application Number 10/539188

Supplemental Amendment to Amendment and Response filed on August 12, 2009  
responding to the Office Action dated May 12, 2009

2. (Original) The method for deuteration according to claim 1, wherein X is a carbonyl group in the general formula [1].
3. (Original) The method for deuteration according to claim 1, wherein X is a hydroxymethylene group in the general formula [1].
4. (Canceled)
5. (Previously Presented) The method for deuteration according to claim 1, wherein the deuterated solvent is deuterium oxide (D<sub>2</sub>O).
6. (Currently Amended) The method for deuteration according to claim 1, wherein the only one activated catalyst is one obtained by activating a non-activated catalyst selected from a palladium catalyst, a platinum catalyst, a rhodium catalyst, a ruthenium catalyst, a nickel catalyst and a cobalt catalyst by contacting with hydrogen gas or heavy hydrogen gas.
7. (Previously Presented) The method for deuteration according to claim 6, wherein the contact of the non-activated catalyst with hydrogen gas or heavy hydrogen gas is conducted in a deuteration reaction system.
8. (Currently Amended) The method for deuteration according to claim 1, wherein the only one activated catalyst is a catalyst comprising an activated palladium based catalyst.
9. (Original) The method for deuteration according to claim 8, wherein the activated palladium based catalyst is an activated palladium carbon.
10. (Canceled)

Application Number 10/539188  
Supplemental Amendment to Amendment and Response filed on August 12, 2009  
responding to the Office Action dated May 12, 2009

11. (Currently Amended) A method for deuteration of a compound represented by the general formula [1]:



wherein,  $R^1$  represents an alkyl group, an alkyl group having at least one carbon-carbon double bond and/or at least one triple bond, an aralkyl group, or an aralkyl group having at least one carbon-carbon double bond and/or at least one triple bond;  $R^2$  represents an alkyl group or an alkyl group having at least one carbon-carbon double bond and/or at least one triple bond, an aryl group, an aralkyl group, an alkoxy group, an aryloxy group or a hydroxyl group; X represents a carbonyl group or a hydroxylmethylene group;  $R^1$  and  $R^2$  may form an alicyclic ring together with a carbon atom contained in X; provided that  $R^2$  represents an alkyl group, an alkyl group having at least one carbon-carbon double bond and/or at least one triple bond, an aryl group or an aralkyl group when X is a hydroxylmethylene group,

comprising reacting the compound represented by the general formula [1] under neutral condition with a deuterated solvent in the co-presence of an only one activated catalyst ~~selected from a palladium catalyst, a platinum catalyst, a rhodium catalyst, a ruthenium catalyst, a nickel catalyst and a cobalt catalyst;~~

provided that when the compound represented by the general formula [1] has at least one carbon-carbon double bond and/or at least one triple bond, the catalyst activated in advance is used as the activated catalyst, and

the compound represented by the general formula [1] is tricyclo[5.2.1.0<sup>2,6</sup>]decan-8-ol, and the activated catalyst is a catalyst comprising palladium carbon ~~and platinum carbon.~~

12. (Original) Tricyclo[5.2.1.0<sup>2,6</sup>]decan-8-ol wherein deuteration ratio thereof is 60% or more.

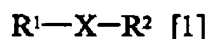
13. (Previously Presented) The method for deuteration according to claim 1, provided that when the compound represented by the general formula [1] has at least one carbon-

Application Number 10/539188  
Supplemental Amendment to Amendment and Response filed on August 12, 2009  
responding to the Office Action dated May 12, 2009

carbon double bond and/or at least one triple bond, hydrogen gas or heavy hydrogen gas is not present in a deuteration reaction system.

14. (New) The method for deuteration according to claim 1, wherein the only one activated catalyst is a catalyst comprising an activated platinum catalyst.

15. (New) A method for deuteration of a compound represented by the general formula [1]:



wherein,  $R^1$  represents an alkyl group, an alkyl group having at least one carbon-carbon double bond and/or at least one triple bond, an aralkyl group, or an aralkyl group having at least one carbon-carbon double bond and/or at least one triple bond;  $R^2$  represents an alkyl group or an alkyl group having at least one carbon-carbon double bond and/or at least one triple bond, an aryl group, an aralkyl group, an alkoxy group, an aryloxy group or a hydroxyl group; X represents a carbonyl group or a hydroxylmethylene group;  $R^1$  and  $R^2$  may form an alicyclic ring together with a carbon atom contained in X; provided that  $R^2$  represents an alkyl group, an alkyl group having at least one carbon-carbon double bond and/or at least one triple bond, an aryl group or an aralkyl group when X is a hydroxylmethylene group,

comprising reacting the compound represented by the general formula [1] under neutral condition with a deuterated solvent in the co-presence of an only one activated catalyst selected from a palladium catalyst, a platinum catalyst, a rhodium catalyst, a ruthenium catalyst, a nickel catalyst and a cobalt catalyst; provided that when the compound represented by the general formula [1] has at least one carbon-carbon double bond and/or at least one triple bond, the catalyst activated in advance is used as the activated catalyst, and

the compound represented by the general formula [1] is tricyclo[5.2.1.0<sup>2,6</sup>]decan-8-ol, and the activated catalyst is a catalyst comprising platinum carbon.

Application Number 10/539188  
Supplemental Amendment to Amendment and Response filed on August 12, 2009  
responding to the Office Action dated May 12, 2009

### REMARKS

Favorable reconsideration of this application is requested in view of the following remarks.

Claim 1 has been amended to limit a number of the activated catalyst to one catalyst. Examples are presented in tables 1-3 on pages 29-31, respectively, of the specification. Accordingly, claim 10 has been canceled, and claims 6 and 8 have been amended editorially. Claim 14 has been amended to include only activated platinum catalyst as supported by examples 17-18 and 29 in tables 2-3 on pages 30-31, respectively, of the specification. Claim 11 has been amended to limit the activated catalyst to only palladium carbon catalyst as supported by examples 16 and 21-23 in table 30 of the specification. Claim 15, which includes only platinum carbon catalyst, has been added as supported by examples 17-18 in table 2 on page 30 of the specification.

In view of the above, Applicants request reconsideration of the application in the form of a Notice of Allowance.

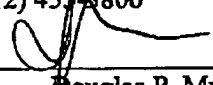


Dated: November 25, 2009

DPM/my/jls

Respectfully submitted,

HAMRE, SCHUMANN, MUELLER &  
LARSON, P.C.  
P.O. Box 2902  
Minneapolis, MN 55402-0902  
(612) 451-3800

By:   
Douglas P. Mueller  
Reg. No. 30,300

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**HAMRE, SCHUMANN,  
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**FAX TRANSMISSION**      November 25, 2009

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
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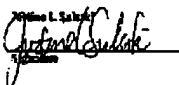
Title of Document:      SUPPLEMENTAL AMENDMENT (6 PAGES)

Applicant:      ITO ET AL.  
 Serial No.:      10/539188  
 App. Filed:      June 16, 2005  
 Group Art No.:      1621

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By:   
 Name: Douglas P. Mueller  
 Reg. No.: 30,300

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      November 25, 2009  
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